

THE GENUS *EMBELIA* N. BURMAN (MYRSINACEAE) IN AUSTRALIA

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Summary

Embelia N. Burman is represented by four species in Australia of which three are new, viz *E. caulialata*, *E. curvinervia* and *E. grayi*. All species are described with notes on their affinities and distribution. A key to distinguish the species is also provided.

Introduction

The genus *Embelia* in Australia was previously represented by only the well known *E. australiana* (F. Muell.) Bailey, and two or three undescribed taxa closely related to this species. The other species described from Australia was correctly placed in *Tapeinosperma flueckigeri* (F. Muell.) Mez.

Increased recent collecting due mostly to various floristic projects in Queensland and Northern Territory has provided a sufficient number of representative specimens in this genus to adequately understand the previously poorly known new species and to allow the description of the following species, so that they can be included in the Census of Queensland Plants.

Two of the new species viz *E. grayi* and *E. curvinervia* are closely related to *E. australiana*, and are known only from Australia, while *E. caulialata* is quite distinct and extends into Papua New Guinea.

Taxonomy

Embelia N. Burman, Fl. Ind. 62, t.23 (1768); Mez, Pflanzenr. 9: 295–332 (1902). Type: *E. ribes* N. Burman

Derivation of name: *Embelia*, a vernacular name for one of the species viz *E. ribes*, from Sri Lanka.

Dioecious scandent shrubs or vines. Leaves petioled, distichous or spirally arranged, entire (Australian species), glabrous, dotted with red brown or black glandular dots or streaks. Inflorescences axillary or terminal, fascicled or solitary, racemose or paniculate, sometimes subumbellate. Flowers small, 4- or 5-merous; pedicellate; calyx deeply lobed, lobes imbricate; petals free or slightly connate at their base, imbricate or contorted, usually papillate on the inner side and along the margins, mostly glabrous outside; stamens and staminodes usually inserted towards the base of the petals, stamens longer or shorter than petals; filaments subulate, glabrous; anthers dorsifixed, longitudinally dehiscent, usually dorsally punctate and verrucose with a cluster of wart-like glands above point of attachment with the filament; ovary in male flowers minute, in females globose or ovoid, few-ovuled; style short, persistent; stigma broad, disciform. Fruit a drupe, usually globose to subovoid, apiculate (persistent style), usually drying black; seed subglobose.

About 130 species (Mabberley 1989), in Asia, Malesia, western Pacific and Australia. Four in Australia.

Key to the species

1. Flowers 5-merous; inflorescences paniculate, large, 6–19.5 cm long. Leaves with 16–18 pairs of fine, slender lateral nerves; apex acuminate; lamina 2.5–3.5 times as long as wide; young stems usually winged . . . 1. *E. caulialata*
- Flowers 4-merous; inflorescences racemose, subumbellate or paniculate, small, 0.3–9.5 cm long. Leaves with 5–8 pairs of prominent lateral nerves; apex usually obtuse; lamina less than 2 times as long as wide; young stems not winged 2

2. Panicles terminal, 3–9.5 cm long, branching from the base; flowers subsessile, pedicels to 1.5 mm long; fruits to 4×4 mm. Leaves thinly coriaceous, lateral nerves strongly arched and ascending 2. *E. curvinervia*
 Racemes or subumbels axillary or terminal, 0.3–3.5 cm long; flowers conspicuously pedicellate, pedicels 1.5–6 mm long; fruits to 9.5×9 mm. Leaves thinly or thickly coriaceous, sometimes thick, \pm rigid, lateral nerves \pm oblique or patent and looping near margins 3
3. Racemes 9–17-flowered; peduncles 1–3.3 cm long, densely papillose; sepals narrowly ovate, acuminate, not dotted; stamens longer than the petals. Leaves with broad usually truncate bases, reticulate veins closely arranged; petioles 10–17 mm long 3. *E. grayi*
 Racemes or subumbels reduced, 3–7-flowered; peduncles 1–7(–20) mm long, glabrous; sepals broadly ovate, abruptly acuminate, black-dotted; stamens shorter or as long as the petals. Leaves with subacute or rarely broad bases; reticulate veins laxly arranged; petioles 5–7(–10) mm long 4. *E. australiana*

1. *Embelia caulialata* S. Reyn. sp. nov. a speciebus ceteris Australianis caulibus juniores angulatis plerumque angustialatis, foliis anguste ellipticis, et inflorescentiis paniculatis, floribus pentameris differt. **Typus:** Queensland, COOK DISTRICT: Cape Tribulation, 16°05'S, 145°29'E, 28 May 1982, K.A.W. Williams 82050 (holo: BRI).

Scrambling shrubs or vines; stems to 8 cm diameter, pale brown with loose bark and scattered lenticels, young stems angular and usually narrowly winged. Leaves narrowly elliptic, $8.5\text{--}13.1 \times 3.8\text{--}4.5$ cm (juvenile leaves to 16×3 cm, with long acumen), shortly acuminate at apex; margins entire; base subacute; thinly coriaceous; lower surfaces pale, densely black-dotted with \pm globose glandular dots; midrib sunken above; lateral nerves 16–18 pairs, very slender, patent, \pm parallel; reticulate venation obscure; petioles 6–10 mm long, deeply channelled above. Inflorescences axillary or terminal, paniculate, densely flowered, male panicles $6\text{--}10 \times 7\text{--}10$ cm, females $7\text{--}19.5 \times 5\text{--}14$ cm; peduncles pubescent with thick short spreading reddish brown hairs; branches patent, 3.5–8 cm long (female panicles with longer branches); bracts narrowly ovate, $1.5\text{--}3 \times 0.5\text{--}1$ mm, glabrous, sparsely ciliate. Flowers 5-merous, creamy green, slightly perfumed; pedicels 1–1.5 mm long, patent hairy; calyx to 1×1.5 mm, lobed to near base; lobes broadly ovate, $0.5\text{--}0.7 \times 0.5\text{--}0.7$ mm, usually erose, membranous, glabrous, ciliolate; petals imbricate, elliptic, $1.5\text{--}2 \times 1$ mm, glabrous outside except papillose margin, densely papillose inside; stamens longer than petals, exserted; filaments 1–1.25 mm long; anthers shorter than filaments, to 0.5×0.5 mm, broadly obloid to ovoid, verrucose dorsally; staminodes to 0.7 mm long; ovary glabrous, ovoid; stigma disciform or capitate. Drupes subovoid, $3\text{--}3.5 \times 3$ mm, reddish purple to maroon, usually black when ripe. **Fig. 1G–O.**

Selected specimens: Papua New Guinea. Wariarata Sogeri subdistrict, Central Division, Mar 1986, Womersley NGF 8765 (BRI). Australia. Queensland. COOK DISTRICT: Between Lockerbie and Somerset, $10^{\circ}47'S$, $142^{\circ}30'E$, Dec 1980, Hyland 10948 (BRI, QRS); Mt Tozer near Iron Ra., $12^{\circ}45'S$, $143^{\circ}12'E$, Nov 1977, Tracey 14839 (BRI); between Gap Ck. and Bloomfield beach, May 1969, Smith (BRI); T.R. 176, Monkhouse, $15^{\circ}45'S$, $145^{\circ}16'E$, near Shipton's Flat, Oct 1982, Hyland 12137 (BRI, QRS); Rex Ra. $16^{\circ}34'S$, $145^{\circ}18'E$, Sep 1985, Goodwin & Tracey C2924 (BRI); Wopen Ck Rd, $17^{\circ}27'S$, $145^{\circ}33'E$, Aug 1989, Gray 20262 (BRI, QRS); Clump Point, $17^{\circ}52'S$, $145^{\circ}35'E$, May 1945, Flecker 9336 (BRI, QRS).

Distribution and habitat: Northeastern Queensland, from Cape York Peninsula to Clump Point, near Mission Beach (Map 2), also in southern New Guinea; usually along creeks on alluvial soils in mesophyll vine forests or swampy forests.

E. caulialata is distinguishable from all the other *Embelia* species in Australia, by its large paniculate inflorescences, 5-merous creamy green flowers, narrow elliptic leaves, and usually winged young angular stems. It appears to be closely related to *E. cotinoides* (S. Moore) Merr. from New Guinea which also has 5-merous flowers, but the latter species has broad elliptic leaves, black-dotted calyx, petals and fruits, and stamens with long anthers and very short filaments.

Etymology: The specific epithet (*cauli* (Latin), stem, *alata* (Latin), wing) refers to the usually winged (especially young) stems.



Fig. 1. A-F. *Embelia curvinervia*: A. branchlet with flowers $\times 0.67$. B. male flower $\times 8$. C. calyx $\times 12$. D. petal with stamen $\times 12$. E. anther $\times 25$. F. fruit $\times 6$. G-O. *Embelia caulialata*: G. portion of adult stem $\times 0.67$. H. portion of young stem with narrow wings $\times 1$. I. female inflorescence $\times 0.5$. J. male flower $\times 8$. K. female flower $\times 8$. L. calyx $\times 12$. M. petal with stamen $\times 12$. N. dorsal view of stamen, showing glands at point of attachment of filament and anther $\times 25$. O. fruit $\times 6$. A-E, Wightman 325 & Dunlop; F, Russell-Smith 6102 & Lucas; G,H, Webb & Tracey 9266; I,K,L, Williams 82050; J,M,N, Flecker 9336; O, Godwin & Tracey C2924.

2. *Embelia curvinervia* S. Reyn. sp. nov. quoad flores ad *E. australianam* (F. Muell.) Mez accedit, sed ab ea differt inflorescentiis paniculatis multo majoribus, fructibus parvulis, nervis lateralibus conspicuis, gracilis, valde arcuato-ascendentibus. **Typus:** Northern Territory. Near Bull Creek, 13°53'S, 131°17'E, 2 July 1946, S.T. Blake 16287 (holo: BRI; iso: BRI).

Scandent shrubs or vines; stems usually densely lenticellate with broadly ellipsoid, pale lenticels; young branchlets with scattered, small, rusty brown club-shaped hairs. Leaves broadly elliptic or ovate-elliptic, 5.5–8.7(–12.7) × 3.5–6(–7.3) cm, apex obtuse or ± rounded; margins entire; base subobtusely or subtruncate; thinly coriaceous, shiny, green above, pale and dull below, usually with scattered ellipsoid or subglobose pellucid red-brown to black dots, the dots denser at margins; conspicuously nerved and reticulate veined; lateral nerves 5–9 pairs, slender, oblique, strongly arched and ascending at tips and looping away from margins; reticulate venation laxly arranged; petioles 1.5–2.2 cm long, channelled above. Inflorescences terminal, usually paniculate, branching from the base, 13–17-flowered, male panicles 3–5.5 cm long, females 8–9.5 cm long; branches patent, 1–4.8 cm long, peduncles sparsely hairy, with thick, short, ± club-shaped, brown, sometimes glandular hairs, and crinkly long multicellular hairs; bracts small, narrowly ovate or linear, 1–2.5 × 0.7–1 mm, densely hairy with long reddish, multicellular, crispate hairs. Flowers 4-merous, cream to dark-orange, slightly perfumed; pedicels 0.5–1.5 mm long, sparsely hairy with thick short hairs; calyx 0.8–1.5 × 1.5–2 mm, lobed to near middle, glabrous, cream or purplish, lobes narrowly ovate, 0.7–1.3 × 0.5–0.7 mm, sparsely black glandular-dotted; petals imbricate, elliptic or ovate-elliptic, occasionally shortly clawed, auriculate above the claw and enclosing the filaments, 1.5–2 × 1 mm, obtuse, cream or purplish on outsides and usually sparsely dotted with minute black dots, glabrous except papillose margins; orange inside and covered with dense, thick, short, often glandular papillae; stamens longer than petals, filaments 1.5–3 mm long; anthers shorter than filaments, 0.5–0.7 × 0.5 mm, broadly ovoid or obloid, rarely verrucose dorsally, pale yellow; staminodes shorter than petals; ovary globose, glabrous; styles to 1 mm long; stigma capitate. Drupes globose, to 4 × 4 mm, ripening red; pericarp thin, ribbed and wrinkled when dry. **Fig. 1A–F.**

Selected specimens: Northern Territory. Black Jungle, 12°33'S, 131°14'E, Nov 1982, *Wightman* 306 (BRI,DNA); Berry Springs, Jul 1971, *Baloogy* 1426 & *Byrnes* (DNA); Stapleton, Numuru Ck, Oct 1988, *Russell-Smith* 6102 & *Lucas* (BRI,DNA); Channel Point, 13°10'S, 131°17'E, Nov 1982, *Wightman* 326 & *Dunlop* (DNA); Adelaide R. – Daly R. Rd, 13°29'S, 131°04'E, Aug 1978, *Dunlop* 5025 (BRI); near Bull Ck, 13°53'S, 131°17'E, Jul 1946, *Blake* 16287 (BRI). Queensland. COOK DISTRICT: Claudie R., towards Tozer's Gap, 12°45'S, 143°15'E, Oct 1984, *Gray* 3648 (BRI,QRS); ditto, Oct 1986, *Hyland* 21192 (BRI).

Distribution and habitat: Northern Australia, from Channel Point to near Goodparla Station, Northern Territory, and near Claudie R., Cape York Peninsula, Queensland (**Map 1**); usually near permanent water, viz rivers, creeks and streams, in monsoon forests.

E. curvinervia is distinguishable by its shiny, usually thinly coriaceous leaves with conspicuous strongly arched and ascending lateral nerves, paniculate inflorescences terminating branchlets, 4-merous cream to dark orange flowers and small fruits. It approaches *E. australiana* of which it has the 4-merous flowers, but the latter species differs particularly by its very small racemose or subumbellate, few-flowered inflorescences and large fruits.

E. curvinervia also appears to be closely related to *E. frangulifolia* (Span.) Mez from Timor, but the type of the latter species (Timor, *Spanoghe* s.n. (L)), and a few collections of this species available for study, differ from the former species in its fairly thin leaves, very fine slightly oblique lateral nerves and smooth dry fruits.

Etymology: The specific epithet (*curvi* (Latin), curved; *nervia* (Latin), nerves) refers to the strongly arched ascending lateral nerves.

3. *Embelia grayi* S. Reyn. sp. nov. *E. australianam* (F. Muell.) Mez aemulans differt racemis longioribus elongatis, dense papillois, calycibus eglandulosis et foliis tenuioribus, dense conspicue reticulato venosis. **Typus:** Queensland. NORTH KENNEDY DISTRICT: S.F.R. 194 adjacent to Por. 69 Herberton, 17°28'S, 145°28'E, altitude 1000 m, 28 November 1978, *B. Gray* 1153 (holo: BRI; iso: BRI,QRS).

Vine with densely lenticellate stem; lenticels globose or ellipsoid, pale, contrasting with dark brown stem; young parts, peduncles and pedicels with short red papillae. Leaves



Map 1-3. Distribution of *Embelia* spp.: 1. *E. curvinervia* ▲; *E. grayi* ○. 2. *E. caulialata* ○. 3. *E. australiana* ○.

broadly elliptic or oblong-elliptic, 4-6.8(-8.5) × 2.5-4.7(-7) cm, obtuse at both ends, or truncate at base; glabrous or with scattered papillae on the midrib below, shiny above, pale below, ± rigid, usually densely dotted with transparent globose glandular dots and streaks; midrib sunken above; lateral nerves 7-9 pairs, ± oblique or patent, looping near margins; reticulate venation closely arranged, forming a fine mesh, conspicuous; petioles 1-1.7 cm long, grooved above. Inflorescences in the axil of leaves or old leaves, racemose, 1.2-4 cm long, 9-17-flowered, male racemes usually shorter than the females; peduncles 1-3.3 cm long, densely papillose with red papillae; bracts narrowly ovate to ovate-oblong, to 4 × 1 mm, papillose. Flowers 4-merous, pinkish cream; pedicels patent, male pedicels 1.5-2.5 mm long, females 3-4.5 mm long; calyx to 1.25 × 2.5 mm, lobes divided to near base, narrowly ovate, 0.5-1 × 0.2-0.5 mm, sparsely papillose outside; petals imbricate, ovate-elliptic or elliptic, 1.25-2.5 × 1-1.25 mm, apex acuminate or obtuse, recurved, papillose inside; stamens longer than petals; filaments longer than anthers, 1.5-2 mm long, exserted; anthers ovoid, to 0.5 × 0.5 mm, not punctate dorsally; staminodes to 1.25 mm long; styles to 1.5 mm long, sparsely papillose, stigma lobed. Fruits not seen.

Selected specimens: Queensland. COOK DISTRICT: Gadgarra S.F.R., 17°15'S, 145°45'E, Jul 1971, *Hyland* 5273 (BRI, QRS); Yungaburra, date unknown, *Bick* AQ 91599 (BRI); Waugh's Pocket, Oct 1945, *Flecker* 9679 (BRI, QRS). NORTH KENNEDY DISTRICT: S.F.R. 194 adjacent to Por. 69, Herberton, 12°28'E, 145°28'E, Nov 1978, *Gray* 1153 (BRI, QRS).

Distribution and habitat: Northeastern Queensland, around Atherton Tableland (Map 1); in high altitude rain forests and in *Hypoetrum* sp. swamp.

E. grayi is distinguishable by its long, densely papillose, racemose inflorescences, 4-merous pinkish cream flowers, and closely reticulate-veined broad elliptic leaves. It is comparable to *E. australiana* of which it has the flowers, but the latter species has fairly thick, laxly reticulate-veined leaves, and very reduced, few-flowered inflorescences usually terminating short branchlets.

Etymology: The species is named in honour of Mr Bruce Gray (QRS), the collector of the type, for his contribution to our knowledge of Australian rainforest plants especially climbing plants.

4. *Embelia australiana* (F. Muell.) Bailey*, Qd Fl. 3: 950 (1900); *Choripetalum australianum* F. Muell., Fragm. 3:36 (1862). **Type:** New South Wales. Clarence River, *H. Beckler* s.n. (n.v.).
Mez, Pflanzenreich. 9: 331(1902).

Samara australiana (F. Muell.) F. Muell., Fragm. 6: 164 (1868).
Benth., Fl. austral. 4: 274 (1869).

Scandent shrubs or vines, stems thick with pale brown bark, usually densely lenticellate with conspicuous red ellipsoid lenticels; branchlets often zig-zag, glabrous. Leaves variable in size, elliptic or elliptic-obovate, 2.6–8.5(–10.5) × 1.2–4(–5.2) cm (juvenile leaves ovate or elliptic, 11 × 6.7–7.5 cm), apex obtuse or rounded; base subacute or cuneate, rarely obtuse or truncate; subcoriaceous, sometimes rigid, glossy green to yellowish, densely dotted with conspicuous globose, oblong or ellipsoid, pellucid or opaque, reddish brown or blackish dots; lateral nerves oblique or patent, ascending and looping near margins; reticulate venation lax, prominent especially below; petioles 5–10 mm long, flexuose, reddish. Inflorescences usually terminating short branchlets, racemose or rarely subumbellate, 3–7-flowered; peduncles 1–7(–20) mm long, glabrous, rarely sparsely papillose; bracts ovate, 0.5–0.8 × 0.5–0.8 mm, sparsely papillose to glabrous, black-dotted. Flowers 4-merous; pedicels 3–6 mm long, slightly thick, glabrous; calyx 0.8–1.2 × 1–1.5 mm, lobed to below middle, glabrous, black-dotted; lobes 0.5–0.8 × 0.5 mm, broadly ovate, abruptly acuminate, ciliate; petals imbricate, elliptic or oblong, obtuse, 2–3.2 × 0.7–0.9 mm, reflexed, papillose inside, black-dotted; stamens as long as petals or slightly shorter, filaments 0.7–1.5 mm long, exserted; anthers 0.5–0.7 × 0.5–0.7 mm, ovoid-ellipsoid, emarginate or apiculate, punctate dorsally. Drupes subglobose, 6.5–9.5 × 6–9 mm, green with black flecks and spots, red or blackish purple when ripe, usually verrucose by dark raised spots, sometimes slightly ribbed when dry.

Selected specimens: Papua New Guinea. Beara, Gulf District, May 1945, *White* 13045 (BRI). Australia. Queensland. COOK DISTRICT: Tinaroo Ra. Rd, between Mareeba and Tinaroo Dam, 17°06'S, 145°35'E, May 1972, *Webb & Tracey* 11493 (BRI); S.F.R. Barton, Jan 1958, *Volck & Dansie* 1421 (BRI). NORTH KENNEDY DISTRICT: Mt Dryander near Proserpine, date unknown, *Michael* 825 (BRI). SOUTH KENNEDY DISTRICT: Dalrymple Heights and vicinity, Jul–Nov 1947, *Clemens* s.n. (BRI). WIDE BAY DISTRICT: Kin Kin, Mar 1916, *White & Francis* s.n. (BRI). MORETON DISTRICT: SE side of Mt French, Aug 1988, *Forster* 4685 & *Bird* (BRI); Coolumb beach, Apr 1978, *Jessup & Sharpe* 116 (BRI). New South Wales. Ballina, Feb 1894, *Bauerlen* 1167 (BRI).

Distribution and habitat: From Atherton Tableland, northeastern Queensland, extending to as far south as Williams R., New South Wales (Map 3), also at Beara in southern New Guinea; usually in dry rain forests or edge of rainforests.

E. australiana is easily distinguishable from other *Embelia* species in Australia, by its very small few-flowered inflorescences and large fruits.

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*The correct authors for this species should be (F. Muell.) Bailey and not (F. Muell.) Mez, as indicated in some literature. F.M. Bailey made the combination in 1900, two years before Mez.

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